

| Notice of Allowability | Application No. | Applicant(s) |
|-------------------------------|------------------------|-------------------------------------|
| | 10/660,437 | KASPAR ET AL. <i>[Signature]</i> |
| | Examiner | Art Unit |
| | Henry S. Hu | 1713 |

-- **The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. This communication is responsive to IDS of February 17, 2004.
2. The allowed claim(s) is/are 1-36.
3. The drawings filed on _____ are accepted by the Examiner.
4. Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All
 - b) Some* c) None of the:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
1) hereto or 2) to Paper No./Mail Date _____.
 - (b) including changes required by the attached Examiner's Amendment / Comment or in the Office action of
Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. Notice of References Cited (PTO-892)
2. Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 2-17-04
4. Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. Notice of Informal Patent Application (PTO-152)
6. Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. Examiner's Amendment/Comment
8. Examiner's Statement of Reasons for Allowance
9. Other _____.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in two telephone interviews with **Brian E. Szymanski (tel. 651 737-9138) on November 8, 2004** to amend the following claims and specification:

Claims

Claim 2 at line 2 delete the word of “about”

Claim 14 at line 2 delete the word of “about”

Specification

page 3 at line 1 replace the word of “pre-emulsionof” with “pre-emulsion of”

page 10 at line 32 in the table Please replace the word of “perfluoromethylether” with “perfluoromethyl vinylether”

page 13 at line 2 Please replace the word of “perfluoromethylether” with “perfluoromethyl vinylether”

page 14 at line 13 Please replace the word of “perfluoromethylether” with “perfluoromethyl vinylether”

page 15 at line 11 Please replace the word of “ammoniumperfluorooctanoate” with “ammonium perfluorooctanoate”

page 15 at line 11 Please replace the word of “bromotetrafluoro ethylene” with “bromotrifluoroethylene”

DETAILED ACTION

2. Applicants' two IDs filed on December 24, 2003 and February 17, 2004 were both received. The above examiner's amendment has corrected the improper language in specification, particularly to use the same word as “perfluoromethyl vinylether” cited in page 1 at lines 19-20 and Claim 1-(d) for monomer PMVE. **Claims 1-36** are pending now. An Action follows.

Allowable Subject Matter

3. Claims 1-36 allowed.
4. The following is an examiner's statement of reasons for allowance: The above claims are allowed over the closest references:
5. *The limitation of parent Claim 1 in the present invention relates to a fluoropolymer suitable for the preparation of a fluoroelastomer, said fluoropolymer comprising repeating units derived from: (a) 10-40 mol% of tetrafluoroethylene, (b) 40-65 mol% of vinyldene fluoride, (c) 1-30 mol% of a perfluorinated vinyl ether of the formula CF₂=CF-O-CF₂-CF₂-CF₂-O-CF₃; and (d) 1-20 mol% of perfluoromethyl vinylether. Parent Claim 13 relates to a fluoroelastomer comprising the same units/amount of Claim 1, while parent Claim 24 relates to a fluoroelastomer composition of Claim 1 with the amount of (c) and (d) being at least 13 mol%. See other limitations of dependent Claims 2-12, 14-23 and 25-36.*
6. In a close examination, all three parent Claims 1, 13 and 24 of present invention carry the same limitation for a fluorinated tetrapolymer (quad-fluoropolymer) comprising units from “tetrafluoroethylene (10-40 mol%), vinyldene fluoride (40-65 mol%), CF₂=CF-O-CF₂-CF₂-CF₂-O-CF₃ (perfluoromethoxypropyl vinylether or MV 31) (1-30 mol%) and perfluoromethyl vinylether (PMVE) (1-20 mol%)”. It is noted that the language of “comprising“ is used here.

As disclosed by the Applicants, the present application relates to a methodology to improve **the preparation of a fluoroelastomer by using such a specific combination of four different monomers.** In addition to examine the two IDS submitted by the Applicants, an EAST search by the examiner and a structural search by the PTO library (tracking number 135584) were both executed.

US Patent No. 6,380,337 B2 to Abe et al. only discloses a process for producing a fluoroelastomer comprising units of (a) VDF (65-85 mol%), (b) MV31 (0.5-30 mol%), to be optionally with TFE (0-10 mol%), and/or (d) poly(alkyl vinyl ether) including PMVE (0-25 mol%) (abstract, line 1-12). Although four claimed monomers are mentioned, the ratio of TFE is at most 10 mol% and both PMVE and TFE are only used as an option. Therefore, Abe does not teach or fairly disclose the claimed fluorinated tetrapolymer.

US Patent No. 5,696,216 to Krueger et al. only discloses a process for producing a fluoroelastomer comprising units of VDF, at least one fluorinated propene and/or PMVE, at least one perfluoro(polyoxaalkyl vinyl ether) including MV31 (See column 2, line 63), optionally TFE and crosslinkng active reactive sites (abstract, line 1-5). Although four claimed monomers are mentioned, TFE is only used as an option. Additionally, the claimed ratio is not disclosed. Therefore, Krueger does not teach or fairly disclose the claimed fluorinated tetrapolymer.

US Patent No. 5,891,974 to Saito et al. only discloses a process for producing a crosslinkable bromine-containing fluoroelastomer comprising units of TFE, a perfluoro(vinyl ether) of $\text{CF}_2=\text{CF-O-(CF}_2)_2\text{-}(\text{OCF}_2)_n\text{-OCF}_3$, and a bromine-containing cure site monomer (abstract, line 1-8). **Only TFE is disclosed.** Therefore, Saito does not teach or fairly disclose the claimed fluorinated tetrapolymer.

US Patent No. 6,610,807 B2 to Duchesne et al. only discloses a process for producing a fluoropolymer comprising units of TFE, VDF, $\text{CF}_2=\text{CF-R}_f$, and a perfluoro(vinyl ether) of $\text{CF}_2=\text{CF-(OCF}_2\text{-CF(R}_f\text{))}_n\text{-OR}_f$ (abstract, line 1-8). It is noted that R_f is a perfluoroalkyl or a perfluoroalkoxy group. **Only TFE and VDF are disclosed.** Therefore, Duchesne does not teach or fairly disclose the claimed fluorinated tetrapolymer.

US Patent No. 5,173,553 to Albano et al. only discloses a process for producing a fluoropolymer comprising units of TFE, VDF, HFP, and a perfluoro(vinyl ether), which may include PMVE (abstract, line 11-19). **Only TFE, PMVE and VDF are disclosed, no MV31 is disclosed.** Therefore, Albano does not teach or fairly disclose the claimed fluorinated tetrapolymer.

US Patent No. 5,260,393 to Arcella et al. only discloses a process for producing a VDF-based fluoropolymer comprising units of TFE (0-17 mol%), VDF (48-65 mol%), HFP (21-36 mol%), and a perfluoro(alkyl vinyl ether) or PAVE which may include PMVE (abstract, line 1-

6). **Only TFE, PMVE and VDF are disclosed, no MV31 is disclosed.** Therefore, Arcella does not teach or fairly disclose the claimed fluorinated tetrapolymer.

US Patent No. 5,349,093 to Oka et al. only discloses a process for producing a fluorovinyl ether having a general formula of $\text{CF}_2=\text{CF}-\text{O}-(\text{CF}_2\text{CF}_2\text{CF}_2\text{O})_n-\text{R}_f$ which may include monomer of MV31 (abstract, line 1-5). **Some other monomeric compounds may be used for copolymerization with MV31** (columns 4-5). However, **no claimed four monomers are used together.** Therefore, Oka does not teach or fairly disclose the claimed fluorinated tetrapolymer.

In a close examination of the **structural search report by USPTO library for this fluorinated tetrapolymer (quad-fluoropolymer)**, the examiner confirms that no claimed tetrapolymer is disclosed or suggested. Even the search notes said: "**There were only two polymers cited on pages 1-9 with all four monomeric compounds, unfortunately each polymer had one or two extra monomeric components**", the mole ratio is not correct, and the polymer carries extra monomer(s) which may be a crosslinker.

9. In summary, the above-mentioned **seven** references, in combination or alone, fail to teach or fairly suggest **the preparation of a fluoroelastomer by using such a specific combination of four different monomers.**

Additionally, the present invention has shown in examples along with some comparative examples for using such a specific combination of four different monomers to prepare a

fluoroelastomer (see pages 12-19 for **examples 1-8** along with its **comparative examples 1-3 and Tables 1-2**). Therefore, all the above-mentioned references, in combination or alone, does not teach or fairly suggest the limitations of present invention.

10. The key issue, regarding a fluorinated tetrapolymer or quad-elastomer **comprising** tetrafluoroethylene, vinylidene fluoride, $\text{CF}_2=\text{CF-O-CF}_2\text{-CF}_2\text{-CF}_2\text{-O-CF}_3$ and perfluoromethyl vinylether with a specific mole ratio, cannot be overcome by any or the combination of the above references, therefore, the present invention is novel.

11. As of the date of this office action, the examiner has not located or identified any reference that can be used singularly or in combination with another reference including the above references to render the present invention anticipated or obvious to one of the ordinary skill in the art. Therefore, the three independent and parent **Claims 1, 13 and 24** are allowed for the reason listed above. Since the prior art of record fails to teach the present invention, the remaining pending **Claims 2-12, 14-23 and 25-36** are passed to issue.

12. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Henry S. Hu whose telephone number is (571) 272-1103. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization

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where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Henry S. Hu



November 8, 2004

TATYANA ZALUKAEVA
PRIMARY EXAMINER

